

John Penman

glass artist *adj.* person using glass as an artistic medium to produce sculptures or three-dimensional artworks. *john penman is a glass artist.*

Stirring End of Purpose

The idea for this body of work derived from replacing weathered finials on my house with hand made glass objects.

Finials appear in many cultures, and usually have in common that they are superfluous. Why than, would one want to spend days in front of the furnace to replace them? Finials became my medium to explore the borderline of function, aesthetics and expression.

The objects pinpoint the transition from functional to

non - functional, from tangible to intangible, from the restricted ground of pragmatic reason to the infinite sphere of imagination. Finials point upwards to a place of spirituality, inspiration and intuition.

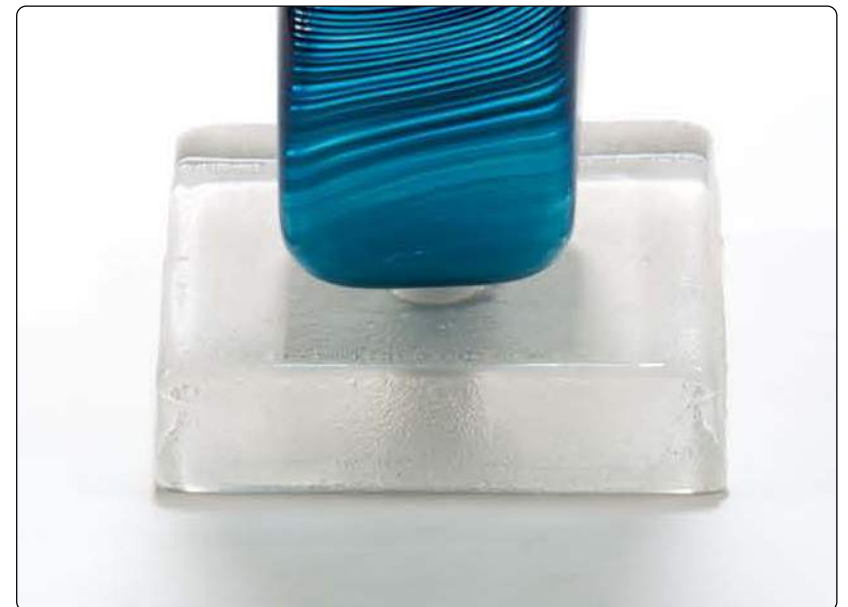
Individually blown glass elements featuring → filigrana (cane work) are joined for the objects' main structure, which is pegged into a solid glass base made by → sand casting.





stirring end of purpose *inspired by* → finials

finial |'finēəl| *noun* a distinctive ornament at the apex of a roof, pinnacle, canopy, or similar structure in a building, or an ornament at the top, end, or corner of an object. **ORIGIN** late Middle English : from Old French *fin* or Latin *finis* 'end.'



technique 1. → blown glass **2.** → sand casting **3.** → filigrana

colours various

dimensions (*in mm approximately/ h x w x d*) range from 1000 x 180 x 180 to 1600 x 200 x 200

Pohutukawa Series

Legends tell of the young warrior Tawhaki and his attempt to enlist help in heaven to avenge his father's death. When he fell back to earth his blood became the crimson flowers of the Pohutukawa.

At the northernmost point of New Zealand is a point of land where the Tasman Sea meets the Pacific Ocean. On this rock spit is a single Pohutukawa tree which has

been clinging bravely to the rock for 800 years.

The small, wind-beaten tree is reputed to guard the entrance to a sacred cave through which disembodied spirits pass on their way to the next world.

The Pohutukawa Series is John's homage to this magnificent and culturally significant plant.





pohutukawa vase *noun* the vase from the 'pohutukawa series' is available in different shapes and sizes. *The pohutukawa vase is a homage to the → pohutukawa.*

pohutukawa *noun* (te reo) a coastal evergreen tree that produces a brilliant display of crimson flowers made up of a mass of stamens. *Pohutukawa has found an important place in NZ culture for its*



strength and beauty and is regarded as a chiefly tree (rākau rangatira) by Māori.

technique 1. → blown glass 2. → double incalmo 3. → glass threads
colours 1. teal 2. cherry red
dimensions (approximately in mm / h x w x d) left 330 x 150 x 150
 right 230 x 200 x 200

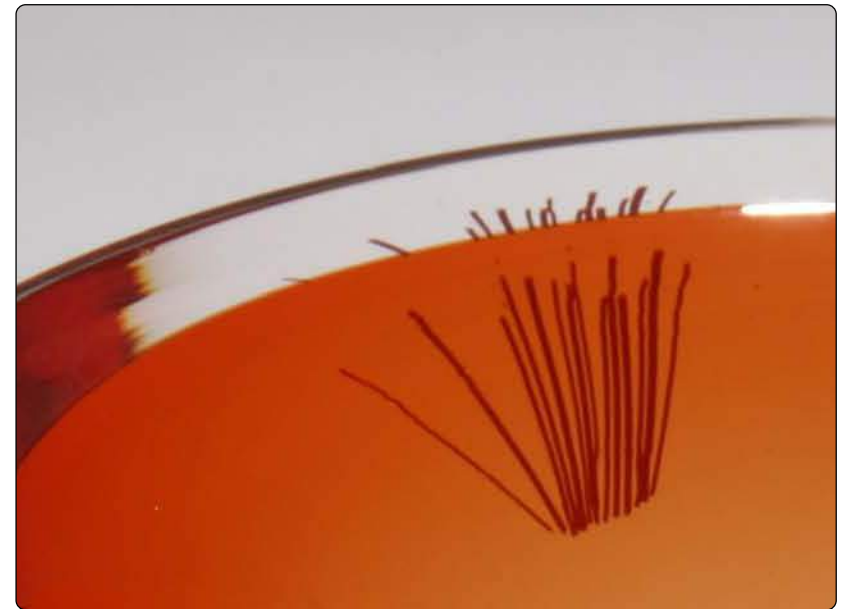


pohutukawa bowl *noun* the bowls from the 'pohutukawa series' are available in a variety of shapes and colours. The pieces are ground and polished resulting in interesting projections of the →**glass threads** onto the extra thick rim. see also →**pohutukawa** [see page 3](#)

technique 1. →blown glass 2. →glass threads 3. →grinding 4. →polishing
colours cherry red
dimensions (*in mm approximately/ h x w x d*) 50 x 120 x 120



pohutukawa bowl *noun* see page 4



technique 1. →blown glass, 2. →glass threads. 3. →grinding 4. →polishing

colours 1. french vanilla (**upper left**) 2. lapis blue, (**lower left**) 3. scarlet (**upper right**) 4. cherry red (**lower right**) 5. ferrari red (all threads).

dimensions (*in mm approximately / h x w x d*) 50 x 120 x 120

Harakeke Series

*Hutia te rito o te harakeke,
Kei whea te komako e ko?
Ki mai ki ahau;
He aba te mea nui o te Ao?
Maku e ki atu,
he tangata, he tangata, he
tangata*

*(If the heart of harakeke was
removed, where will the
bellbird sing?*

*If I was asked, what was the
most important thing in the
world;
I would be compelled to reply,
It is people, it is people, it is
people!)*

*The proverb reflects the Māori
reference to the harakeke plant
as a whanau or family group.
The outer leaves are the tupuna
(ancestors); the inner leaves are
the matua (parents); the most
inner leaf is the rito or pepe
(baby). Only the tupuna are
cut as the matua are left to
protect the pepe.*

*Accordingly the proverb reflects
that without the sound of
children in the world (the next
generation) mankind will not
survive.*





harakeke bowl *noun* the bowls from the 'harakeke series'.

The harakeke bowl is a homage to →harakeke

harakeke *noun* (te reo) evergreen perennial plant native to NZ (often referred to as NZ flax) and Norfolk Islands. *Ka pukuriri ia ki a mātau, ka patua mātau e ia ki tōna pōtae harakeke.* (When he was angry with us he would hit us with his flax hat).

technique 1. →blown glass 2. →filigrana using john's secret →cane

3. →grinding 4. →polishing

colours 1. john's special harakeke mix

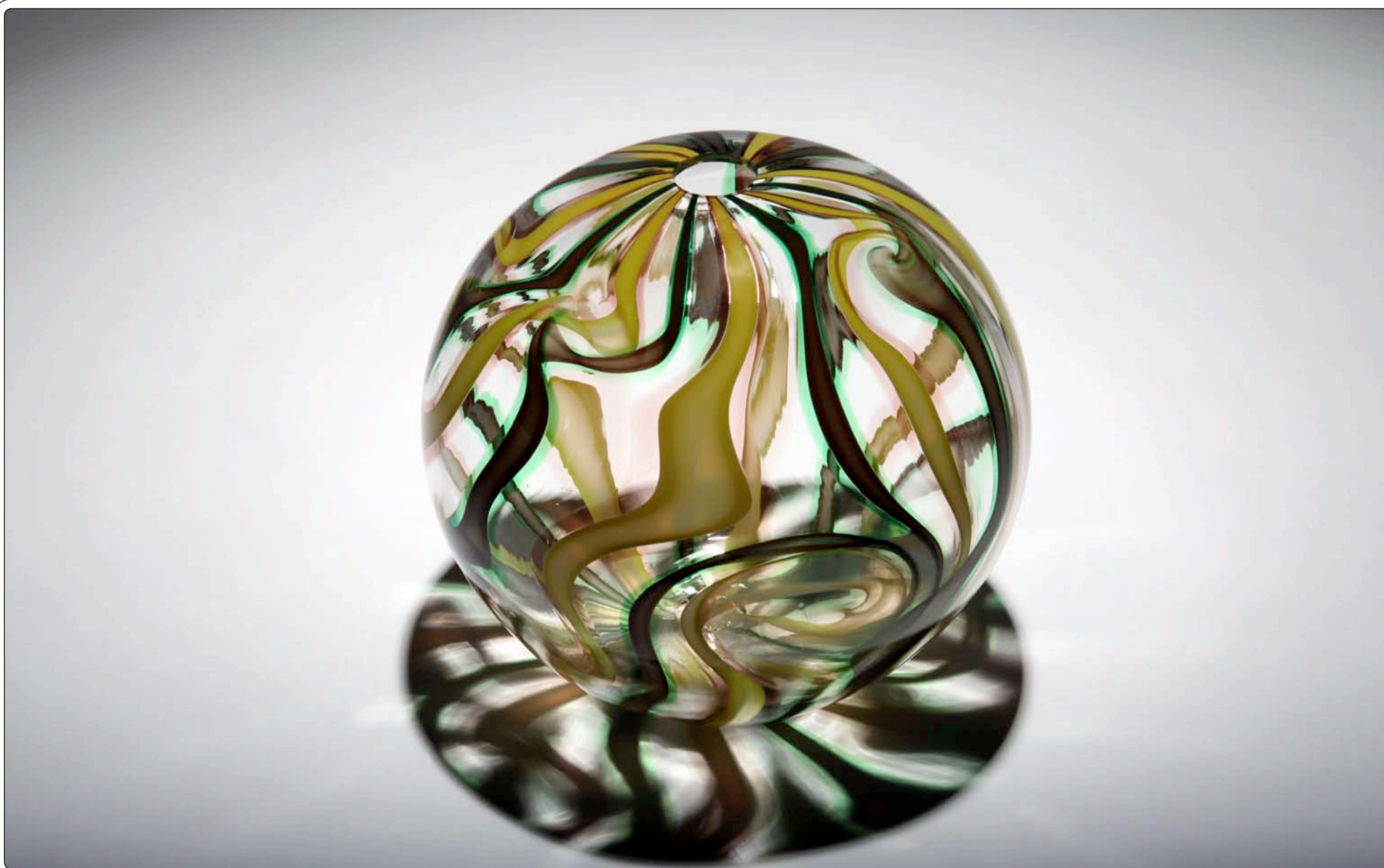
dimensions (in mm approximately / h x w x d) 50 x 140 x 140



harakeke vase *noun* the vases from the 'harakeke series'.



technique 1. →blown glass 2. →filigrana using john's secret →cane
colours 1. john's special harakeke mix
dimensions (*in mm approximately / h x w x d*) 300 x 110 x 110



harakeke orb *noun* the →orb from the 'harakeke series.'

orb (from Latin *orbis* = 'circle') 1. a sphere or spherical object. 2. a celestial body such as the sun or moon | *archaic*: the earth 3. one of a series of concentric transparent spheres thought by ancient and medieval astronomers to revolve about the earth and carry the celestial bodies

technique 1. →blown glass 2. →filigrana using john's secret →cane

colours 1. john's special harakeke mix

dimensions (*in mm approximately / h x w x d*) 180 x 180 x 180

Kaimoana Series

As well as being a major food source, *kaimoana* (seafood) is a very important way of showing hospitality (*manaaki*) and generosity. The food provided for guests is a great status symbol in Māori culture, and *kaimoana* rates highly.

Spaghetti Vongole

Ingredients

- 1kg live shellfish (eg pipi)
- ½ C extra virgin olive oil
- 4 garlic cloves, finely chopped
- 4 shallots, finely chopped
- ½ tsp chilli flakes
- ¼ C dry white wine
- 400 gms dried spaghetti
- small bunch parsley, chopped

Method

Clean the shellfish by rinsing in water.

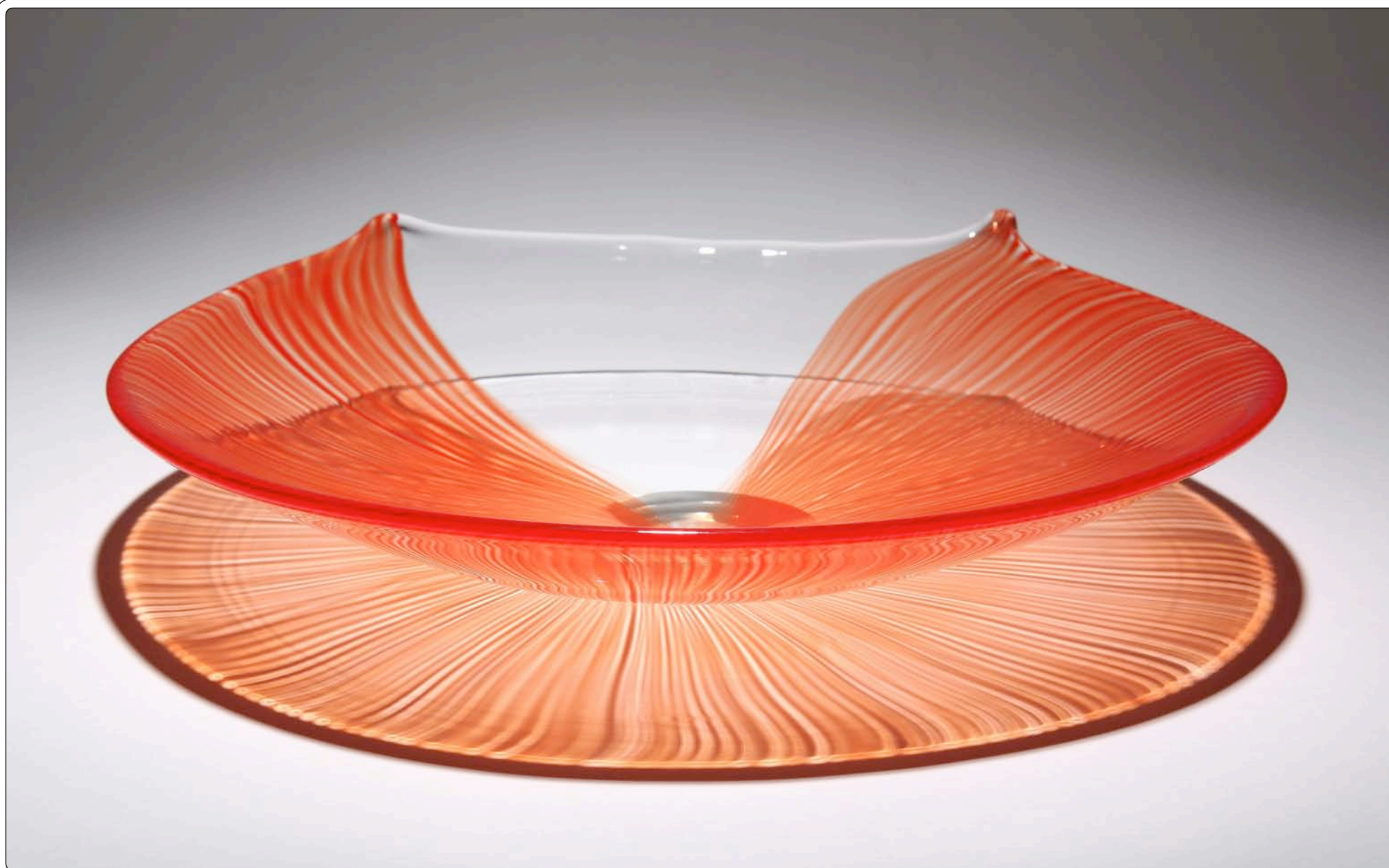
Heat the oil in a large saucepan with a tight fitting lid. Add the garlic, shallots, chilli flakes and wine and bring to the boil.

Add the shellfish and cover. Steam over a high heat for three to four minutes, shaking the pan, until the shells open.

Meanwhile, cook the spaghetti in plenty of boiling salted water until al dente (about eight minutes), then drain.

Add the spaghetti and parsley to the saucepan and toss through. Season with salt and pepper and serve in deep pasta bowls.





tupa platter *noun* this platter from the kaimoana series is inspired by →**tupa**. Available in a clear (pictured) or frosted finish.

tupa (*te reo*) (also *tipa*) scallop, a fan-shaped bivalve mollusc found on sand and mud-banks from low tide level to depths of 45 m. The top shell is flat and the bottom half curved. *Ko te kaupapa o te haere ko te kohi tote, me te kohi anga mātaītai pērā i te tupa.* (The

purpose of the trip was to gather salt and sea shells such as the scallop).

technique 1. →blown glass 2. →filigrana

colours 1. ferrari red

dimensions (*in mm approximately / h x w x d*) 60 x 310 x 330



pipi platter *noun* this platter from the kaimoana series is named after →**pipi**. Available in a frosted (pictured) or clear finish.

pipi (*te reo*) **1.** *noun* a NZ endemic edible bivalve with a smooth shell found at low tide just below the surface of sandy harbour flats. *Pipi* are a traditional food resource for Māori, and were gathered in specific flax baskets. Smaller specimens would fall

between the woven strips and back into the beds as the basket was gently swirled through the water. **2.** *noun* cirrostratus - thin, fairly uniform semi-translucent clouds at high altitude.

technique **1.** →blown glass **2.** →filigrana **3.** →frosting

colours **1.** duro nero

dimensions (*in mm approximately / h x w x d*) 75 x 360 x 270



toheroa platter *noun* this platter from the kaimoana series is inspired by →toheroa. Available in a frosted (pictured) or clear finish.

toheroa (*te reo*) a large edible bivalve mollusc with a triangular shell. *The toheroa has long been esteemed as one of New Zealand's finest sea foods, but unfortunately supplies are limited and strict controls*

have to be enforced. This clam, which grows to 6 in. in length, burrows deeply in sand on beaches that are backed by extensive sand dunes.

technique 1. →blown glass 2. →filigrana 3. →frosting

colours 1. duro nero 2. midnight blue

dimensions (in mm approximately / h x w x d) 85 x 370 x 320



toheroa bowl (upper left & lower left) inspired by →toheroa [see page 13](#)

tupa platter (upper right) inspired by →tupa [see page 11](#). Available in a frosted (pictured) or clear finish [see page 11](#).

pipi platter (lower right) inspired by →pipi [see page 12](#) is available in a clear (pictured) or frosted finish [see page 12](#).



technique (for toheroa bowl) 1. →blown glass 2. →filigrana 3. →grinding 4. →polishing

colours (for toheroa bowl) 1. duro nero 2. midnight blue

dimensions (for toheroa bowl) (*in mm approximately / h x w x d*) 55 x 155 x 155

Photosensitive Glass

Photosensitive glass is a crystal clear glass in which microscopic particles can be formed into an image by exposure to ultraviolet light. Anything which resists the light can act as a "negative."

The photograph is developed by heating the photosensitive glass at around 560°C for several hours after exposure.

Since the image is inside and actually a part of the glass itself, photosensitive glass is the most durable photographic medium known.

The photographic image is not on the surface of the glass, but

Photosensitive glass was invented in November 1937 by Dr. Donald Stookey of the Corning Glass Works, who handed the recipe to New Zealand based glass colour manufacturers Gaffer Glass, who remain the world's sole provider of photosensitive glass.

John's fascination with the material relates back to his passion for printmaking, and he is one of a handful of glass blowers worldwide continuously exploring the possibilities of this extraordinary material.





hue kawakawa *noun* blown glass object from →photosensitive glass inspired by →hue with imagery created by the shadow of →kawakawa

hue *noun* (*te reo*) *noun* calabash, gourd, gourd plant, *Lagenaria siceraria* - a cultivated plant. The hard shell of the fruit is used for a variety of purposes.

kawakawa (*te reo*) *noun* pepper tree, *Macropiper excelsum* - a small, densely-branched tree with heart-shaped leaves. Found throughout the North Island and as far south as Banks Peninsula. Used for ceremonies, including removing tapu, for medicinal purposes, and as a symbol of death. *Tīparetia tōu rae ki te rau kawakawa.* (*Adorn you forehead with kawakawa leaves*).



hue kawakawa (above, bottom right & far right) see page 18
 kawakawa platter (top right) *Woe unto you, scribes and Pharisees, hypocrites! For ye make clean the outside of the cup and of the platter, but within they are full of extortion and excess.* (Matthew 23:25)



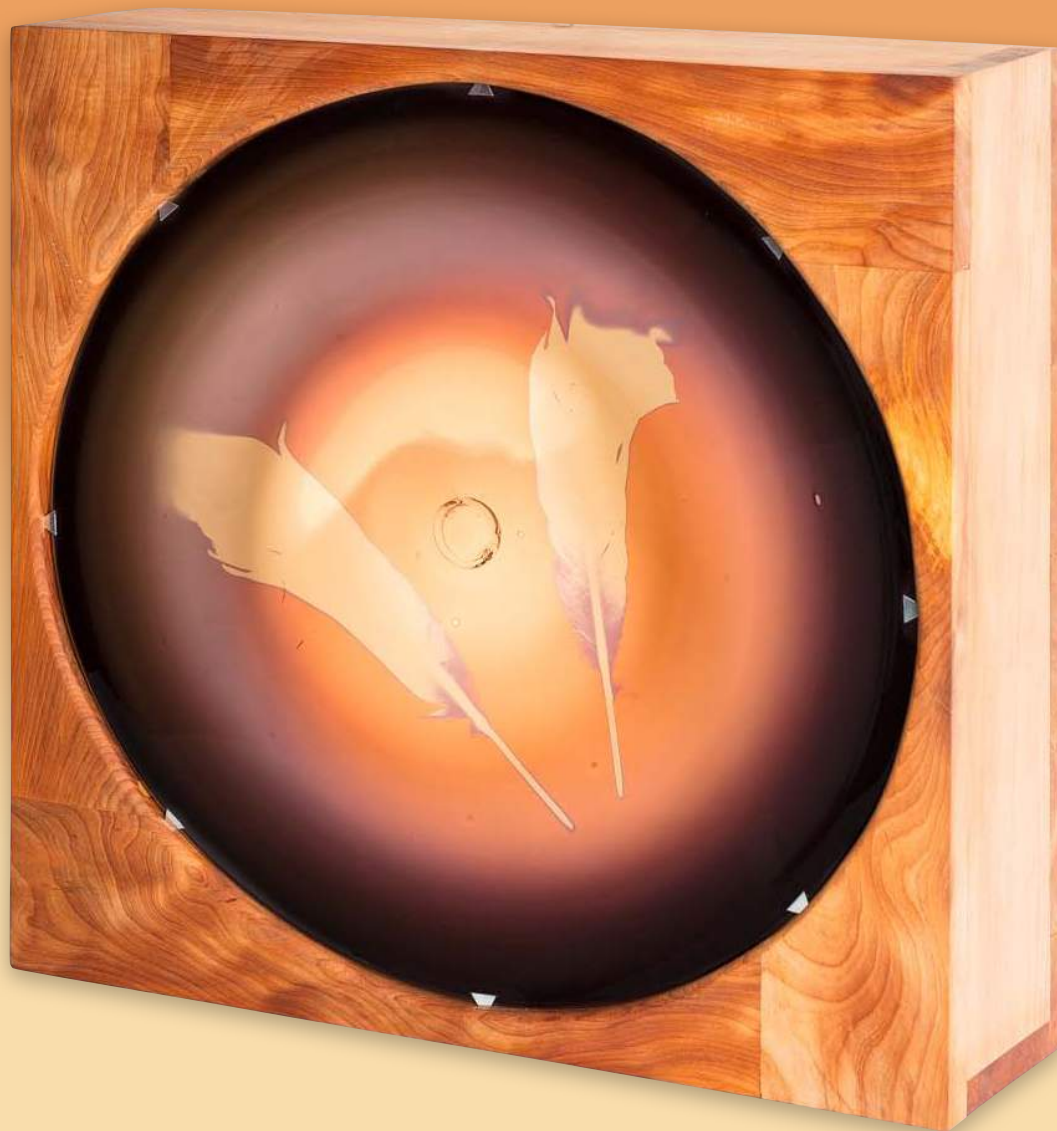
technique 1. →blown glass 2. →photosensitive glass 3. →swedish overlay (hue kawakawa only)
 dimensions (in mm approximately / h x w x d) left 320 x 160 x 160
 top right 65 x 345 x 345 above left 240 x 135 x 135 above right 345 x 195 x 195



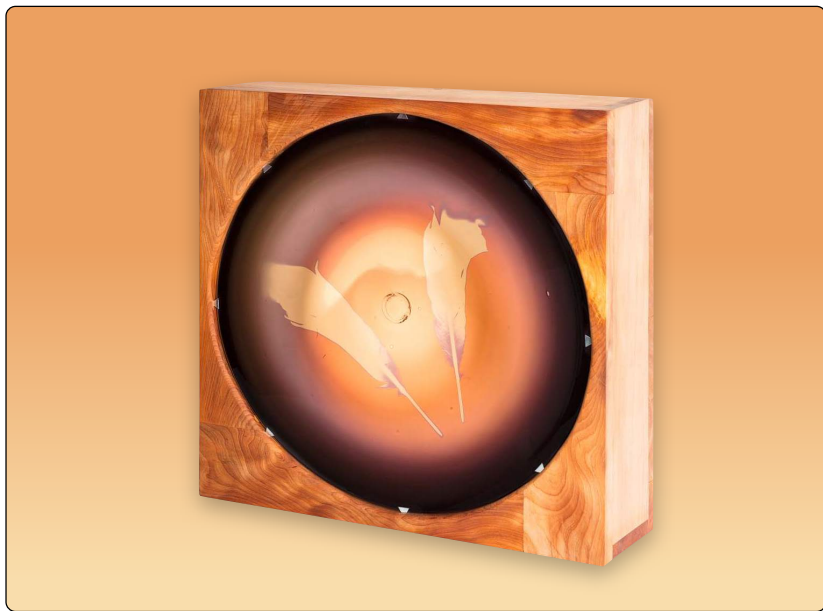
māramatanga *is a series of lightboxes created in collaboration with Oliver Kraft.*

māramatanga (*te reo*) *noun* enlightenment, insight, understanding, light, meaning, significance, brainwave. *Me āpiti e ia te māramatanga o ngā tohunga Māori, ki ngā mātauranga o te ao hou o te Pākehā. (He should place side by side the insight of the*

Māori expert with the knowledge of the new world of the Pākehā)



māramatanga *noun* [see page 20](#)



māramatanga noun see page 20 are built from oiled → **tōtara** and mouth blown photosensitive glass with LED light fittings.

tōtara noun (te reo) Podocarpus totara, Podocarpus cunninghamii - large forest trees with prickly, olive-green leaves not in two rows. Found throughout Aotearoa/New Zealand. *Ka hinga te totara i te wao nui a Tāne, engari, mate atu he tētē kura, whakaete mai he tētē*



kura. (The totara tree in Tane's great forest has fallen, however, a leader falls, and another leader thrusts his way to the front).

technique 1. →blown glass 2. →photosensitive glass

dimensions (in mm approximately/ h x w x d) range from 400 to 500 (h & w) x 125



māramatanga *noun* see page 20 adorned with →bird feathers.
bird feathers *noun* In traditional Māori thought, many birds were seen as chiefly. The feathers of certain birds were used as adornment for high-born people – particularly plumes worn in the hair. Chiefs wore the *kahu huruhuru* (feather cloak), made from the feathers of the most beautiful birds. The three white feathers symbolize

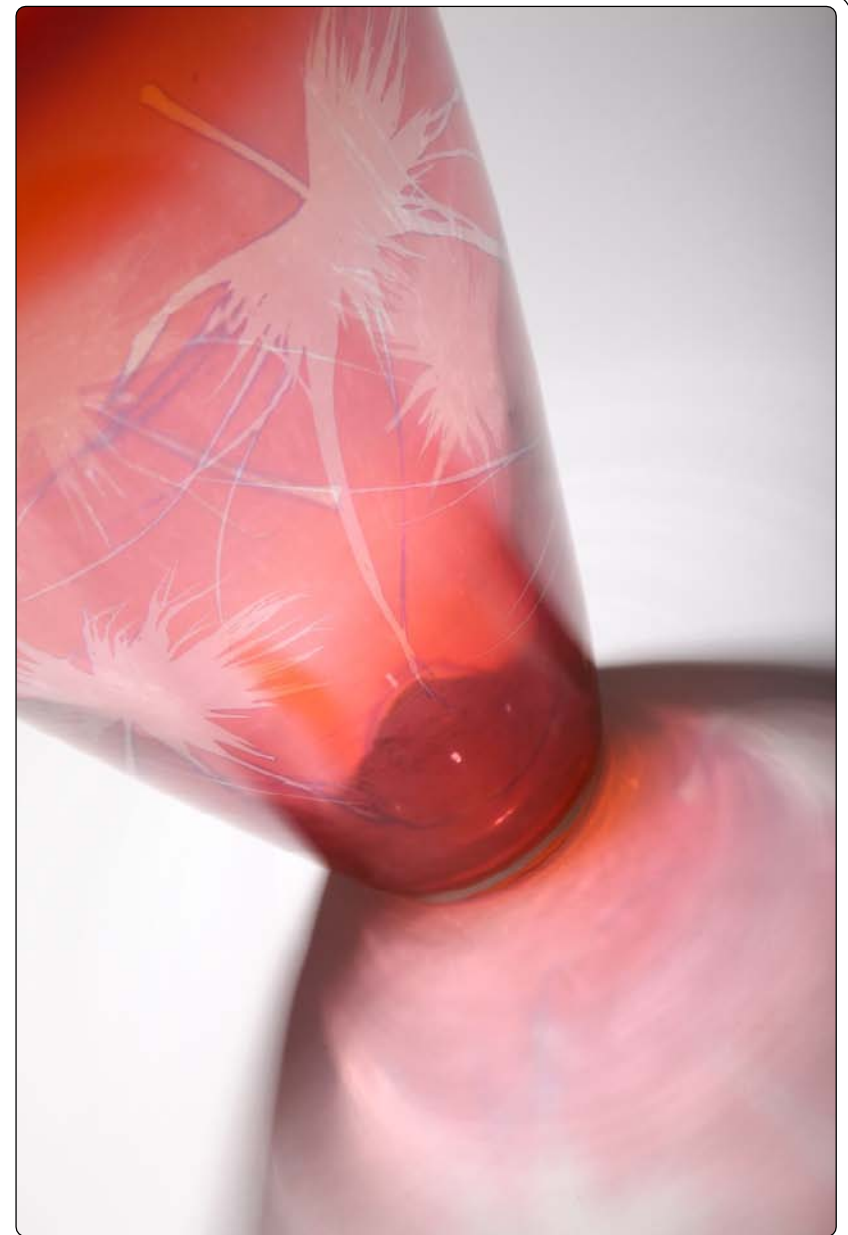


the ethos of passive resistance at Parihaka.



spinnifex vase *noun* blown glass object from photosensitive glass with imagery created by the shadow of →**spinnifex** seeds

spinnifex *noun* *Spinnifex sericeus*, new zealand native sand-binding grass with distinctive runners carrying tufts of floppy grey-green leaves and ball-like seed heads. Spinnifex plants are single-sexed, bearing either male or female flowers. When the wind blows, the



seed heads roll along the beach until they become lodged against some obstacle, and release their seeds.

technique 1. →blown glass 2. →photosensitive glass

colours →photosensitive glass colour overlaid with french vanilla (left) and tea (right)

dimensions (*in mm approximately / h x w x d*) 340 x 190 x 190



spinifex vase *noun* see page 24

technique 1. →blown glass 2. →photosensitive glass

colours →photosensitive glass colour overlaid with tea (**left**) and white opal (**right**)

dimensions (*in mm approximately / h x w x d*) 340 x 190 x 190



light & shadow *noun* blown glass object from photosensitive glass with imagery created by the shadow of →**toetoe**

toetoe (*te reo*) *noun* NZ native plants with long, grassy leaves and a fine edge and saw-like teeth. Flowers are white, feathery, arching plumes. Grow on sand dunes, on rocks and cliff faces, along streams and swamp edges. The plant has many traditional uses in



Māori culture including as a building material as well as medicinal.

technique 1. →blown glass 2. →photosensitive glass

colours photosensitive glass overlaid with white opal

dimensions (*in mm approximately / h x w x d*) 270 x 240 x 240



huru platter *noun* blown glass object from photosensitive glass with imagery created by the shadow of →**huru**

huru (*te reo*) **1.** *noun* feather. *I hūtia ake e te tangata mangumangu he huru manu i taku pare (A black man plucked a feather from my hair).* **2.** *verb* to glow, rise (of the sun).

technique 1. →blown glass **2.** →photosensitive glass
colours photosensitive glass overlaid with tea.

dimensions (*in mm approximately / h x w x d*) 75 x 365 x 365



huru platter *noun* see page 27



technique 1. →blown glass 2. →photosensitive glass
colours photosensitive glass overlaid with tea.
dimensions (*in mm approximately / h x w x d*) 55 x 315 x 315



welcome belle (on left) & **calling captain nemo** (on right) are created in collaboration with Claudine Muru. *Welcome Belle* celebrates the female form and pays homage to the cycle of Motherhood by incorporating images representing the artist's matriarchal line. *Calling Captain Nemo* is inspired by the underwater depths of Moana-nui-a-kiwa (Pacific Ocean), alongside



a fascination for the world residing beneath.
technique 1. →blown glass 2. →photosensitive glass 3. →colour overlay 4. →sculpted hot glass
colours photosensitive glass overlaid with french vanilla
dimensions (in mm approximately / h x w x d) **left** 440 x 260 x 260
right 530 x 260 x 260

Focus on Colour

Glass is a literally brilliant medium to capture the uniquely detailed perception of colour in Aotearoa - a result of the intense light experienced in the South Pacific.

Combined with the availability of a vast range of glass colours manufactured on John's doorstep, the use of colour becomes a central theme throughout most of his work.

To combine different colours in one object asks for complex process in the making - a challenge that has become a passion manifested in John's pieces.





blood orange blue *noun* fresh and complementary colour schemed vessels in a range of shapes and sizes.



technique 1. →double incalmo
colours 1. cobalt blue. 2. scarlet 3. orange
dimensions (in mm approximately / h x w x d) **left** 220 x 240 x 240
right 340 x 125 x 125



cherry apricot tea *noun* fresh and appetising colour schemed vessels in a range of shapes and sizes.



technique 1. →double incalmo
colours 1. cherry red 2. apricot 3. tea
dimensions (in mm approximately / h x w x d) left 450 x 115 x 115
right 260 x 240 x 240



shades of red (- blue; - green) noun vessels featuring shades of one colour in transparent and opaque glass. *shades of red* is made using a challenging combination of *incalmo* as well as overlay techniques.



technique 1. →double *incalmo* 2. →colour overlay
colours (shades of red) 1. cherry red 2. ferrari red (shades of blue) 1. aquamarine 2. french vanilla (shades of green) 1. lime green 2. emerald green
dimensions (in mm approximately / h x w x d) 240 x 260 x 260

Focus on Pattern

*John's fascination with **pattern** has a long history dating back to when he was a kid trying to create his own Moiré **patterns**.*

*The interest remained throughout his childhood, and the recurring calming rhythm of **pattern** formed a welcome antipode to his ever moving life: growing up in Hong Kong, studying in the US, living in the UK and travelling the*

world before starting a studio in New Zealand.

*Coming home to New Zealand with a fresh view on things he rediscovered the richness of **pattern** in Māori art that surrounds him here and connects him to his own whakapapa.*





swirly *adjective* →swirl available in a variety of shapes and colours.

swirl *verb* 1. move in a twisting or spiralling pattern : *the smoke was swirling around him* | (figurative:) *a flood of swirling emotions*. 2. *verb* cause to move in such a pattern : *swirl a little cream into the soup*. 3. *noun* a twisting or spiralling movement or pattern : *she*

emerged with a swirl of skirts | *swirls of colour*.

technique 1. →blown glass 2. →filigrana 3. →incalmo

colours 1. ferrari red 2. scarlet

dimensions (in mm approximately / h x w x d) 125 x 275 x 275



swirly (upper left & right) see page 23

wigwag (middle) a platter in the family of pattern themed objects featuring a →**wig-wag** motif

wig-wag 1. *verb* to move back and forth | wag steadily or rhythmically: *he watched the pendulum wigwag.* 2. *verb* to signal by waving a flag, light, or upraised arm, especially in accordance

with a code. 3. *noun* the act or practice of **wigwagging**. 4. *noun* a message sent by this method.

technique 1. →blown glass 2. →filigrana 3. →incalmo

colours 1. alabaster

dimensions (in mm approximately / h x w x d) **upper left** 125 x 260 x 260 **upper right** 70 x 350 x 350 **middle** 70 x 325 x 290



zigzag (left) blown glass vessels by John Penman featuring a →**zig-zag** pattern.

zig-zag having sharp bends or angles from side to side : *a zig-zag path through the woods.*

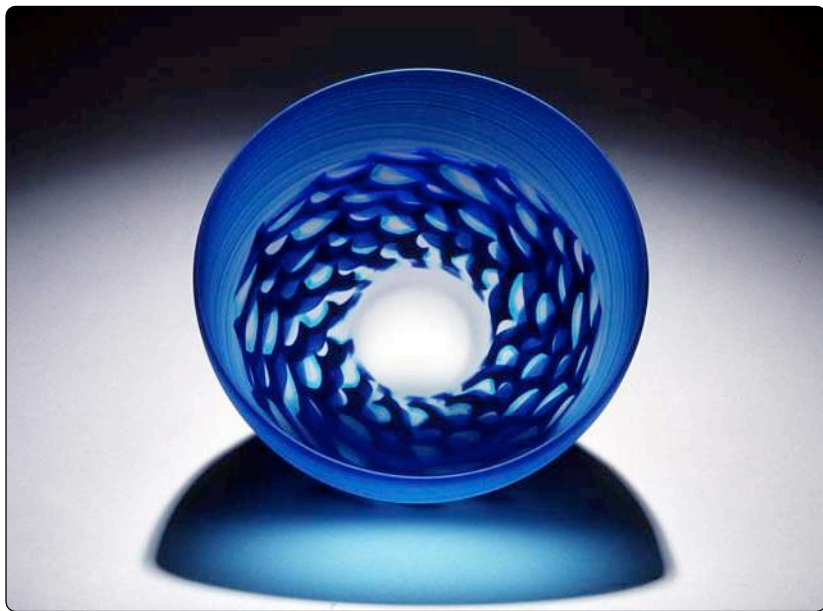
swirly (middle) see page 23

riporipo (right) (*te reo = whirlpool, deep pool*) this object is based on

the awe inspiring sight of a baitball (a shoal of fish attacked by predators resulting in a whirlpool and sinking shimmering scales).

technique 1. →blown glass 2. →filigrana 3. →incalmo 4. →frosting
colours 1. orange (left) 2. saffron (middle) 3. aquamarine (right) 4. cobalt blue (right)

dimensions (*in mm approximately / h x w x d*) 125 x 275 x 275



riporipo (upper left) see page 25

swirly (lower left & right) see page 23

crisscross (upper right) blown glass object featuring a →**criss cross** pattern

criss cross verb 1. to move back and forth : *students crisscrossing the field on their way to school.* 2. to mark with crossing lines. 3. to



proceed or pass back and forth | be arranged in a crisscross pattern: *The streets in that part of town crisscross confusingly.*

technique 1. →blown glass 2. →filigrana 3. →incalmo

colours (for crisscross only) 1. black 2. lemon yellow

dimensions (*in mm approximately / h x w x d*) 125 x 275 x 275



perfume bottle teardrop shaped perfume bottles in a huge range of beautiful colours and varying patterns (no two are the same). *The stopper reaches the bottom of the perfume bottle and has two functions: to seal the bottle and to apply perfume.*



technique 1. →blown glass **2.** →filigrana
colours 1. alabaster & teal (**left**) **2.** duro blue & copper blue (**right / left**) **3.** john's special harakeke mix (**right / right**)
dimensions (in mm approximately / h x w x d) 120 x 50 x 50



perfume bottle see page 27



technique 1. →blown glass **2.** →filigrana
colours 1. white duro (**left**) **2.** alabaster (**right** / the two outer bottles)
dimensions (*in mm approximately / h x w x d*) 120 x 50 x 50



cloud nine in a state of blissful happiness, sometimes also cloud seven (perhaps by confusion with seventh heaven). Some connect the phrase with the 1896 International Cloud-Atlas, long the basic source for cloud shapes, in which, of the ten cloud types, cloud No. 9, cumulonimbus, was the biggest, puffiest, most comfortable looking. *The corona effects seen here on the photographs of cloud*



nine result from light entering the mouth of the objects - projecting interesting shapes onto the glass.

technique 1. →blown glass 2. →double incalmo 3. →colour overlay

colours 1. olive 2. ivory 3. teal

dimensions (in mm approximately / h x w x d) 320 x 160 x160



with a twist a small series of amphora shaped objects in a range of colours →with a twist

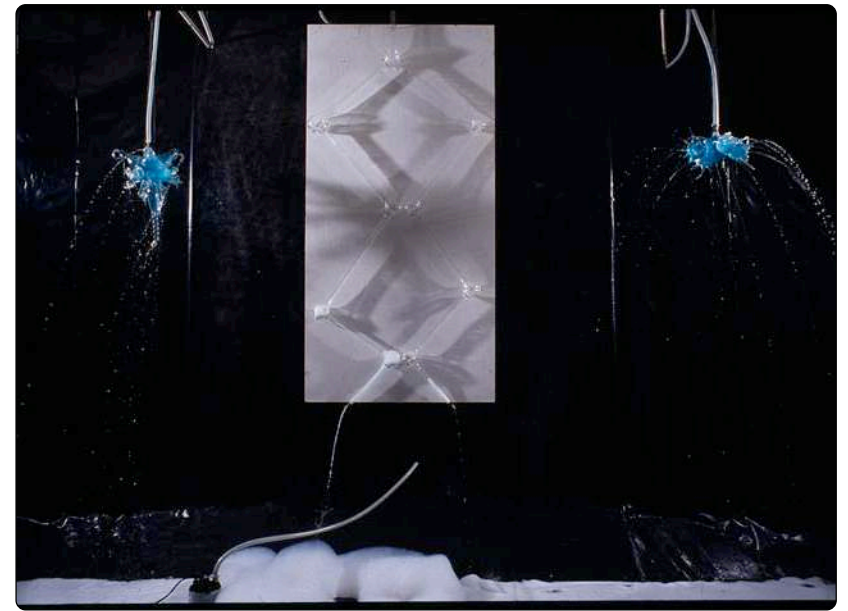
with a twist phrase 1. an unconventional, often unexpected variation of something common. 2. a surprising turn of events. *The official language of Jamaica is English with a twist.*



technique 1. →blown glass 2. →incalmo 3. →filigrana
colours 1. olive (left) 2. granny smith green & ferrari red (twist on left object) 3. scarlet (right) 4. olive & jade (twist on right object)
dimensions (in mm approximately / h x w x d) left 325 x 235 x 235 right 350 x 220 x 220



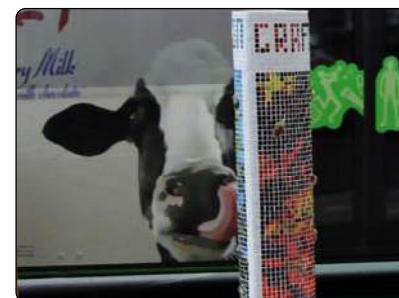
coruscation interactive installation by John Penman using blown glass, water, metal wire, food colouring, mdf, dish washing liquid, plastic tubing, timber and lake foil. **coruscation** was part of the cowboy artists exhibition in Providence, Rhode Island, USA. *“People started throwing lots of coins into the water-pond of the **Coruscation** installation and on one special occasion a visitor*



stripped off all his clothes to go for a whooping shower.”
technique 1. →blown glass **2.** mixed media
dimensions (in mm approximately / h x w x d) 3800 x 5800 x 3200



the grafton column street jewellery | public art by John Penman. 4500 custom coloured, hand made glass tiles and blown glass acorns mounted on concrete. *The grafton column* is Grafton's artistic landmark, displaying colourful pixelated views of oak trees in autumn and spring and becoming night active with a sparkling display of the reflected surrounding lights. John and his team are



able to create public art commissions or “street jewellery” - as he refers to it, with ‘sense of place’. This service includes the entire production from idea development with the client, through to the design and planning, to the final installation on location.
dimensions (in mm approximately / h x w x d) 1510 x 520 x 325
check out the video: <http://johnpenmanpublicart.blogspot.com/>

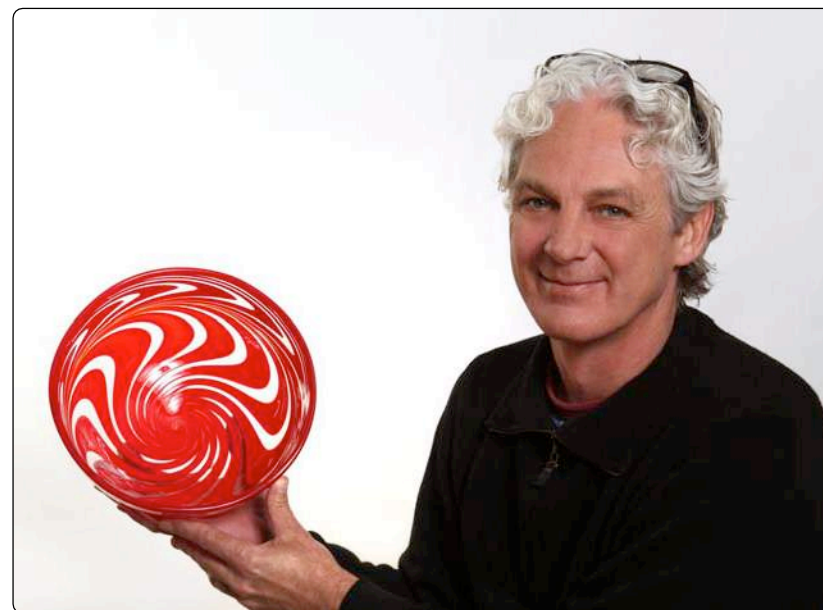
John Penman

*Ko Maungataniwha te Maunga
Ko Taapapa te awa
Ko Ngatokimatawhaurua te
Waka
Ko Mangamuka te Marae
Ko Ngapuhi te whare tupuna
Ko Nukutawhiti te tupuna kei
runga
Ko Rahiri kei raro
Ko Te Uri Mahoe me Ngai
Tupoto nga Hapu
Ko Ngapuhi te Iwi
Ko John Penman taku ingoa*

John Penman grew up between Hong Kong and Aotearoa. As a young man he lived and worked in numerous countries around the world. Receiving a grant, he studied sculpture in the USA at Rhode Island School of Design - majoring in Glass. Since his graduation, John has been attending numerous workshops as part of his artistic develop-

ment. He is running his own studio in Auckland, New Zealand since 1996. His work has been exhibited worldwide, and can be found in in private as well as in permanent public collections in New Zealand and overseas.

John Penman's Art is a fusion of his inner and outer world, fueled by intuition and inspired by culture, patterns, color and form he experienced during his manifold physical and metaphysical journeys. Accumulating and evolving knowledge of technique and material plays a huge role in developing all of his work. This approach has contributed to John's international recognition as a leader in using photosensitive glass as an artistic medium.





making → cane



day at the office

Glossary

blown glass forming an object by inflating molten glass on the end of a blowpipe and manipulating it by swinging, rolling on a marver etc, or shaping it with tools or in a mould.

cane on the blow pipe, glass colour is imbedded in layers of clear glass and formed into a short cylindrical shape. It is then heated to a specific temperature, and stretched into a long rod of up to 20 metres or more. Finally it is cut into lengths and utilised to produce →**filigrana**.

colour overlay the application of a layer of glass over a layer of contrasting colour.

double incalmo see →**incalmo**

filigrana (*italian*) the generic name for blown glass made with colourless, white, and sometimes coloured →**cane**. The filigrana style originated on the Italian island of Murano in the 16th century and spread rapidly to other parts of Europe. Manufacturers on Murano continued until the 18th century, and it was revived in the 20th century.

frosting a matte finish produced by exposing the object to acid
glass threads using very fine threads of usually coloured glass to produce marks on the glass object.

grinding the technique of removing the surface of an object with a rotating wheel fed with an abrasive, or by some other means.

incalmo (*italian*) the technique of constructing an object, usually a vessel, by fusing two or more blown glass elements. The process, first practised in the Islamic world of the Middle Ages, demands great precision because the edges of the adjoining elements must have precisely the same diameter.

photosensitive glass is a crystal clear glass in which microscopic particles can be formed into an image by exposure to ultraviolet light, see page 15.

polishing smoothing the surface of an object when it is cold by holding it against a rotating wheel fed with a fine abrasive.

sand casting a template (eg made of wood) is pressed into sand to make an impression and used as a mould for molten glass.

sculpted hot glass free forming hot glass mounted on a pipe or punty with the help of hand tools but without a mould.

swedish overlay process of joining two different colored bubbles of glass on separate blowpipes together and turning one inside out over the other to achieve layering of different colors.

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